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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/626,998	07/24/2003	Yi-Li Hsiao	67,200-930	3724

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EXAMINER

MACARTHUR, SYLVIA

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 06/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/626,998

Applicant(s)

HSIAO ET AL.

Examiner

Sylvia R. MacArthur

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 24 July 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 3, 5, 7, and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Okudaira et al ((US 5,705,029).

Regarding claim 1: Okudaira et al teaches a dry etching method. The method maintains a substrate support at a set point temperature in a reaction chamber (vessel 1) upon a rise in temperature of the chamber, comprising the steps of:

Circulating a main coolant fluid (cooling gas) having the set point temperature through the substrate support 5; and circulating a compensation coolant fluid (cooling medium) having a cooling temperature lower than said set point temperature through the substrate support upon the rise in temperature of the chamber.

Regarding claim 3: According to col. 6 line 33, Okudaira et al teaches the cooling temperature is in the range of 50 to 130 degrees C.

Regarding claim 5: Water is used to maintain the temperature of the specimen stage see col. 6 lines 31-39.

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Regarding claim 9: Compensation coolant chamber 3 contains a compensation coolant (cooling medium) in fluid communication with the substrate support 5.

3. Claims 1, 9, and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Nagaiwa et al (US 6,723,202).

Regarding claim 1: Nagaiwa et al teaches a dry etching method. The method maintains a substrate support at a set point temperature in a reaction chamber 2 upon a rise in temperature of the chamber, comprising the steps of:

Circulating a main coolant fluid (ethylene glycol) having the set point temperature through the substrate support 6; and circulating a compensation coolant fluid (gas passage 9) having a cooling temperature lower than said set point temperature through the substrate support upon the rise in temperature of the chamber.

Regarding claim 9: Compensation coolant chamber contains a compensation coolant (gas passage 9) in fluid communication with the substrate support 6. See Fig. 1.

Regarding claim 15: The method of Nagaiwa et al provides a compensation circulation loop 11c see col. 6 lines 24-34.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2,4, 6,8, 10, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okudaira et al.

The teachings of Okudaira et al were discussed above.

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Okudaira et al fails to teach that the set point temperature is about 60 degrees C.

However, the set point temperature of the chuck is an optimizable parameter based on such factors as type of coolant used and desired final temperature of substrate. These processing parameter are well within the ordinary skill of one in the art to determine in order to provide the optimal heat transfer between the coolant and the substrate.

Thus, it would have been obvious for one of ordinary skill in the art to choose a coolant with a set point temperature of about 60 degrees C.

6. Claims 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaiwa et al.

The teachings of Nagaiwa et al were discussed above.

Nagaiwa et al fails to teach that the set point temperature is about 60 degrees C.

However, the set point temperature of the chuck is an optimizable parameter based on such factors as type of coolants used and desired final temperature of substrate. This processing parameter is well within the ordinary skill of one in the art to determine in order to provide the optimal heat transfer between the coolant and the substrate.

Thus, it would have been obvious for one of ordinary skill in the art to choose a coolant with a set point temperature of about 60 degrees C.

7. Claims 7 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okudaira et al or Nagaiwa et al in view of Hideo et al (JP 2003-248322).

The teachings of Okudaira et al or Nagaiwa et al were discussed above.

Both fail to teach the coolant temperature is about 50 degrees C.

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Hideo et al teaches a method for producing an original printing plate (a semiconductor manufacturing process). A coolant is used to maintain the temperature of the substrate according to Section [0084]. The coolant temperature is 50 degrees C or less.

The motivation to provide the coolant at that temperature is that it is suggested by Hideo et al that 50 degrees C or less provides the optimal heat transfer for optimal temperature control of the wafer.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to modify the method of Okudaira et al or Nagaiwa with the teachings of Hideo to provide the coolant at 50 degrees C as it provides optimal heat transfer.

9. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaiwa et al in view of Okudaira et al.

The teachings of Nagaiwa et al were discussed above.

Nagaiwa et al fails to teach that the coolant temperature is about 50 degrees C and that the set point temperature is 60 degrees C

Okudaira et al teaches that the coolant temperature is in the range of 50 to 130 degrees C.

The motivation to provide the coolant temperature at the above range is an optimizable parameter. Likewise the set point of the chuck is an optimizable processing parameter. These processing parameters are well within the ordinary skill of one in the art to determine in order to provide the optimal heat transfer between the coolant and the substrate.

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Thus, it would have been obvious for one of ordinary skill in the art to choose a coolant temperature of about 50 degrees C and a set point temperature of about 60 degrees C.

10. Claims 13,14, and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaiwa et al or Okudaira et al. in view of Long et al (US 6,608,352).

The teachings of Nagaiwa et al and Okudaira et al were discussed above.

Both fail to teach a p-n junction module.

Long et al teaches a chuck 208 coupled to a temperature controller 210 a p-n junction current meter 214 is coupled between the p-n junction formed by the first doped region 204 and the drain region 156, see col. 6 lines 9-48.

The motivation to provide a p-n junction module is that it provides a mechanism for determining the thermal resistance of a substrate in an easy yet accurate manner.

Regarding claim 17: A main temperature characteristic curve is seen in Fig. 5.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to modify the method of Nagaiwa et al or Okudaira et to provide a pn junction module to determine the thermal resistance of the substrate and thus enhance process control.


### ***Conclusion***

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sylvia R. MacArthur whose telephone number is 571-272-1438. The examiner can normally be reached on M-F during the core hours of 9 a.m. and 3 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Sylvia R. MacArthur  
Patent Examiner  
Art Unit 1763

June 8, 2005